

- II. "Description of the Skull and Teeth of the *Placodus laticeps*, Ow., with indications of other new Species of *Placodus*, and evidence of the Saurian Nature of that Extinct Genus."
By Prof. RICHARD OWEN, F.R.S. &c. Received February 6, 1858.

(Abstract.)

The author premises a brief sketch of the history of the discovery of the fossils referred by Count Münster, Professors Agassiz, Bronn, and Meyer to the Pycnodont family of Ganoid Fishes, under the generic name of *Placodus*; and then enters upon the anatomical grounds on which he concludes that the *Placodus* is a Saurian reptile. These are stated to be, principally,—1, distinct external bony nostrils, divided by an ascending process of the premaxillary, and bounded by that bone, the maxillaries and nasals; 2, orbits circumscribed below by the superior maxillary and malar bones; 3, temporal fossæ of great size and width, bounded externally by two zygomatic arches, the upper formed by the postfrontal and mastoid, the lower formed by the malar and squamosal; 4, the tympanic bone formed by one bony piece, with a trochlear lower articular surface; the limitation of the teeth to the premaxillary, maxillary, palatine, and pterygoid bones, in the upper jaw, with a demonstrated absence of a median vomerine series, such as exists in the true Pycnodonts. With these proofs of the reptilian nature of the *Placodus*, Prof. Owen combines others exemplifying its affinities to the Lacertian order, and more especially with that modification of *Lacertia* exemplified by the extinct genus *Simosaurus*, from the Muschelkalk.

The author then describes the dentition of the upper jaw of the specimen of *Placodus*, demonstrating the foregoing characters. It includes two premaxillary and three maxillary teeth, forming an outer or marginal series, and two teeth of larger size, forming an inner or palatal series, the last of which is described as the largest grinding tooth in proportion to the size of the head, hitherto known in the animal kingdom.

From the cranial and dental characters the author deduces the specific distinction of his specimen from previously described *Placodi*,

and proposes for it the name of *Placodus laticeps*, in reference to the great breadth of the skull, which equals the entire length, each measuring about 8 inches. All the teeth are implanted in distinct sockets, according to the thecodont type of the Lacertian order. The relation of the large temporal fossæ and of the wide span of the zygomatic arches, to the enormous muscular force required to work the crushing machinery of the jaws, is pointed out.

The structure of the bony nostrils, the orbits, the palate, with other particulars of the cranial anatomy of the *Placodus*, is next described in detail, and compared with the same characters in *Nothosaurus*, *Simosaurus*, *Pistosaurus*, and other Muschelkalk reptiles. The dentition of these Saurians, although, like *Placodus*, thecodont in respect of implantation, is of the ordinary crocodilian type in respect of form, adapted to the prehension of fishes; and there are no palatal teeth. But the author remarks that such teeth exist in the triassic Labyrinthodonts, with a disproportionate magnitude of certain teeth which offers a certain analogy with the dentition of *Placodus*. An account of the microscopic structure of the dentine, enamel, and osseous tissue of the *Placodus* is then given.

The extreme and peculiar modification of the teeth, in respect to form and size, adapting them to the crushing and pounding of hard substances, and the association of the *Placodus* with conchiferous mollusks in such abundance as to have suggested the terms ‘Muschelkalk,’ ‘Terebratuliten-kalk,’ and the like, for the strata containing them, concur in evincing the class whence the *Placodi* derived their chief subsistence; and the author points out the relation of a constant disposition of the teeth, in all the known species, to the readier cracking of shelly substance. A single row of teeth in the lower jaw is always opposed to a double row in the upper one, playing, with its strongest line of force, upon their interspace. Thus the crushing force below presses upon a part between the two points of resistance above, on the same principle on which a stick is broken across the knee; only here the fulcrum is at the intermediate point, the moving powers at the two parts grasped by the hands. It is obvious that a shell pressed between two opposite flat surfaces might resist the strongest bite; but, subjected to alternate points of pressure, its fracture is facilitated.

Certain Australian lizards present teeth with large rounded obtuse crowns, like those of certain *Placodi*, and have on that account received the name of *Cyclodus*, for their genus.

The author next proceeds to describe certain specimens of the mandible or under jaw of the genus *Placodus*. The first of these he refers to a species for which he proposes the name of *Placodus pachygnathus*. The second may probably be the lower jaw of the *Placodus Andriani*, Ag.; but should it prove to belong to a different species, the term *bombidens* would best express the specific peculiarity in the shape of the grinding surface of the teeth. A third species is named *Placodus bathygnathus*, in reference to the great vertical extent of the mandibular ramus.

All the above-described fossils are from the Muschelkalk member of the triassic series, near Bayreuth, Germany, and have been recently acquired for the Palæontological Series in the British Museum.

The Memoir is accompanied by numerous drawings.

March 18, 1858.

The LORD WROTTESELEY, President, in the Chair.

The following communications were read :—

- I. "On the probable Origin of some Magnesian Rocks." By T. STERRY HUNT, Esq., of the Geological Survey of Canada. Communicated by THOMAS GRAHAM, Esq., Master of the Mint. Received July 10, 1857.

The deposits of mineral matters from natural waters offer many points of interest to the geologist. Besides the rock-salt and gypsum, which in many cases have doubtless been formed by the spontaneous evaporation of saline waters, it is well known that many mineral springs charged with carbonic acid under pressure, deposit great quantities of earthy salts when they come to the surface, and that the travertines thus formed often constitute extensive masses. The